BST_DOCKER: 2021年9月26日

需要 启动 docker container

需要将 TSP 全家桶 拷贝到 container 下

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1. docker 操作命令：

```
docker images

docker container ls -a

docker ps -a

docker start --help

docker start <container_id> -i

exit  # 退出并停止当前的 docker container.

docker commit \
    -a "lijin" \
    -m "#5450: 0926: create TSP workspace" \
    127695fedbec \                                  # <container_id>
    a1000-sdk-fad:1.1.2                             # [repository:${tag}]


# Docker容器向宿主机传送文件
docker cp container_id:<docker容器内的路径> <本地保存文件的路径>

docker cp 10704c9eb7bb:/root/test.text /home/vagrant/test.txt

# 宿主机向Docker容器传送文件
docker cp 本地文件的路径 container_id:<docker容器内的路径>

docker cp  /home/vagrant/test.txt 10704c9eb7bb:/root/test.text
```

注01：每天结束，如果 container 有重要更新，需要基于此 container 创建一个新的 image，第二天需要在此 image 上重新创建一个 container。

注02：Docker--从入门到实践 中建议用 dockerfile 代替 docker commit，但是操作有些复杂，先跳过（先使用 docker commit 用作备份）。

docker 内部操作命令：

```
# docker 中安装 package
apt install vim
apt install tree

# 查看 linux 下文件大小
du -sh *  # * --> 可以换成具体文件
```

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2. 操作，将 TSP 全家桶移植到 docker 中（todo）：

在 `192.168.2.32` TSP 中，选定 TSP 全家桶：

- **TauristarPlatform**
  - commit: ad9ffdbff2a59fbde45ea7279369928771fbf24e
- **TauristarPlatformData**
  - commit: d431876880b146d30345ae288708471de4c45c7a
- **TauristarPlatformRecipe**
  - commit: dee0d4159ca6a5297c10354ef38cd63916a70880
- **TauristarPlatformThirdparty**
  - commit: 859201843e0ca6c56538bd2a96299d0d01bd74a5

以及完成 `cross_make.sh` + `x3_cross_make.sh` 的编译（successful）。

```
TauristarPlatform
TauristarPlatformData
TauristarPlatformRecipe
TauristarPlatformThirdparty
TSP 编译器
```

使用：`du -sh *` 查看当前目录下所有文件的大小。

```
root@Desay:/home/marvin/work_ts/ts# du -sh *
1.8G    j3_apa_demo
412M    PC_SIM
4.1M    T1D
1.1G    TauristarPlatform
797M    TauristarPlatformData
1.6G    TauristarPlatformRecipe
6.0G    TauristarPlatformThirdparty
3.8G    test_ts_pc
```

---

3. 在 sever 或 虚拟机 中编译 cross_make（todo）

需要参考：

1：cross_make.sh + vsdk.cmake，

2：x3_cross_make.sh + aiexpress.cmake，

编写

3：bst_cross_make.sh + bst_tools.cmake。

操作01：确定编译器路径（gcc，g++）

```
=+=+=+=+=+=+=+=+=+=+=+=+ tda2: gcc, g++ path，查看: vsdk.cmake

gcc:
${A15_TOOLCHAIN_PREFIX}gcc
${CODEGEN_PATH_A15}/bin/arm-linux-gnueabihf-gcc
${TI_SW_ROOT}/os_tools/linux/linaro/gcc-linaro-5.3-2016.02-x86_64_arm-linux-gnueabihf/bin/arm-linux-gnueabihf-gcc
${HOME}/PROCESSOR_SDK_VISION_03_05_00_00/ti_components/os_tools/linux/linaro/gcc-linaro-5.3-2016.02-x86_64_arm-linux-gnueabihf/bin/arm-linux-gnueabihf-gcc

完整路径:
/home/marvin/PROCESSOR_SDK_VISION_03_05_00_00/ti_components/os_tools/linux/linaro/gcc-linaro-5.3-2016.02-x86_64_arm-linux-gnueabihf/bin/arm-linux-gnueabihf-gcc

g++:
${A15_TOOLCHAIN_PREFIX}g++
${CODEGEN_PATH_A15}/bin/arm-linux-gnueabihf-g++
${TI_SW_ROOT}/os_tools/linux/linaro/gcc-linaro-5.3-2016.02-x86_64_arm-linux-gnueabihf/bin/arm-linux-gnueabihf-g++
${HOME}/PROCESSOR_SDK_VISION_03_05_00_00/ti_components/os_tools/linux/linaro/gcc-linaro-5.3-2016.02-x86_64_arm-linux-gnueabihf/bin/arm-linux-gnueabihf-g++
```

```
完整路径:
/home/marvin/PROCESSOR_SDK_VISION_03_05_00_00/ti_components/os_tools/linux/linaro/gcc-linaro-5.3-2016.02-x86_64_arm-linux-gnueabihf/bin/arm-linux-gnueabihf-g++


=+=+=+=+=+=+=+=+=+=+=+=+= j3: gcc, g++, 查看: aiexpress.cmake

gcc: 完整路径:
/opt/gcc-linaro-6.5.0-2018.12-x86_64_aarch64-linux-gnu/bin/aarch64-linux-gnu-gcc

g++: 完整路径:
/opt/gcc-linaro-6.5.0-2018.12-x86_64_aarch64-linux-gnu/bin/aarch64-linux-gnu-g++



=+=+=+=+=+=+=+=+=+=+=+=+= bst: gcc, g++, 查看: bst_tools.cmake

root@127695fedbec:/home/work/TauristarPlatform/src/tauristar_platform# which aarch64-bst-linux-gcc
完整路径:
/opt/bstos/1.1.2.1/sysroots/x86_64-bstsdk-linux/usr/bin/aarch64-bst-linux/aarch64-bst-linux-gcc

root@127695fedbec:/home/work/TauristarPlatform/src/tauristar_platform# which aarch64-bst-linux-g++
完整路径:
/opt/bstos/1.1.2.1/sysroots/x86_64-bstsdk-linux/usr/bin/aarch64-bst-linux/aarch64-bst-linux-g++
```

操作02：确定 Deps 的版本+路径：

需要修改 `tauristar_platform/CMakeLists.txt` 文件，参考 tda2 与 j3。

```
=+=+=+=+=+=+=+=+=+=+=+=+= tda2: cross_make.sh
cmake -DCMAKE_TOOLCHAIN_FILE=../vsdk.cmake -Dcross_make=ON -DCMAKE_BUILD_TYPE=${BUILD_TYPE}




=+=+=+=+=+=+=+=+=+=+=+=+= j3: x3_cross_make.sh
cmake -DCMAKE_TOOLCHAIN_FILE=../aiexpress.cmake -Dcross_make=ON -DCMAKE_BUILD_TYPE=${BUILD_TYPE} -DBUILD_HORIZON=1 ..




=+=+=+=+=+=+=+=+=+=+=+=+= bst: bst_cross_make.sh 模板。
cmake -DCMAKE_TOOLCHAIN_FILE=../aiexpress.cmake -Dcross_make=ON -DCMAKE_BUILD_TYPE=${BUILD_TYPE} -DBUILD_BST=1 ..
```

```
15
```

解构 CMakeLists.txt：

标记：`CROSS MARK | HORIZON MARK |`

```
root@Desay:/home/marvin/work_ts/ts/TauristarPlatform/src/tauristar_platform#
./x3_cross_make.sh > x3_cross_make.log
CMake Warning (dev) at CMakeLists.txt:2 (project):
  Policy CMP0048 is not set: project() command manages VERSION variables.
  Run "cmake --help-policy CMP0048" for policy details.  Use the
cmake_policy
  command to set the policy and suppress this warning.

  The following variable(s) would be set to empty:

    CMAKE_PROJECT_VERSION
    CMAKE_PROJECT_VERSION_MAJOR
    CMAKE_PROJECT_VERSION_MINOR
    CMAKE_PROJECT_VERSION_PATCH
This warning is for project developers.  Use -Wno-dev to suppress it.

CMake Warning at CMakeLists.txt:94 (message):
  --> CROSS MARK 01


CMake Warning at CMakeLists.txt:97 (message):
  --> HORIZON MARK 01


CMake Warning at CMakeLists.txt:104 (message):
  --> HORIZON MARK 02


CMake Warning at CMakeLists.txt:195 (message):
  --> HORIZON MARK 03


CMake Warning at CMakeLists.txt:226 (message):
  --> HORIZON MARK 04


CMake Warning at CMakeLists.txt:268 (message):
  --> HORIZON MARK 05


CMake Warning at CMakeLists.txt:405 (message):
  --> CROSS MARK 03


CMake Warning at CMakeLists.txt:448 (message):
  --> CROSS MARK 04


CMake Warning at CMakeLists.txt:450 (message):
  --> HORIZON MARK 09
```

```
49
50
51  CMake Deprecation Warning at third_party/yaml-cpp/CMakeLists.txt:10
    (cmake_policy):
52    The OLD behavior for policy CMP0012 will be removed from a future version
53    of CMake.
54
55    The cmake-policies(7) manual explains that the OLD behaviors of all
56    policies are deprecated and that a policy should be set to OLD only under
57    specific short-term circumstances.  Projects should be ported to the NEW
58    behavior and not rely on setting a policy to OLD.
59
60
61  CMake Deprecation Warning at third_party/yaml-cpp/CMakeLists.txt:14
    (cmake_policy):
62    The OLD behavior for policy CMP0015 will be removed from a future version
63    of CMake.
64
65    The cmake-policies(7) manual explains that the OLD behaviors of all
66    policies are deprecated and that a policy should be set to OLD only under
67    specific short-term circumstances.  Projects should be ported to the NEW
68    behavior and not rely on setting a policy to OLD.
69
70
71  PROJECT_SOURCE_DIR
    /home/marvin/work_ts/ts/TauristarPlatform/src/tauristar_platform/tauristar_p
    erception/tauristar_avm
72  PROJECT_SOURCE_DIR
    /home/marvin/work_ts/ts/TauristarPlatform/src/tauristar_platform/tauristar_p
    erception/tauristar_image_pipeline/ts_vision_opencv/chess_detector
73  PROJECT_SOURCE_DIR
    /home/marvin/work_ts/ts/TauristarPlatform/src/tauristar_platform/tauristar_p
    erception/tauristar_image_pipeline/ts_vision_opencv/image_geometry
74  opencv: -lopencv_world
75  boost: -lboost_serialization;-lboost_system;-lboost_program_options;-
    lboost_thread;-lboost_filesystem;-lboost_regex;-lboost_date_time
76  TAURISTAR_BASE_LIBS:  tauristar_flowprocessor;-Wl,--whole-
    archive;tauristar_operations;-Wl,--no-whole-
    archive;tauristar_hd_gridmap;grid_map_core;tauristar_gridmap;apa_info_proces
    s;fcw;lib_avm_dcal;lib_avm;lib_avm_bvc;lib_avm_calib;lib_avm_algobase;lib_av
    m_util;motion_planner;tauristar_geometry;mpc_controller_lib;tauristar_proced
    ure;drlib;basic_util;state_machine_lib;simple_path_planner;lanelet2_extensio
    n_lib;lanelet2_core;lanelet2_io;lanelet2_projection;lanelet2_routing;lanelet
    2_traffic_rules;GeographicLib_SHARED;pugixml
77  Boost libraries:  -lboost_serialization;-lboost_system;-
    lboost_program_options;-lboost_thread;-lboost_filesystem;-lboost_regex;-
    lboost_date_time
78  CMake Warning at CMakeLists.txt:952 (message):
79    --> CROSS MARK 05
80
81
82  CMake Warning:
83    Manually-specified variables were not used by the project:
84
85      CMAKE_TOOLCHAIN_FILE
86
```

4. 在 local 编译 `x3_cross_make.sh`(bst 版本)

了解 CMakeLists.txt 中 不同平台的编译框架（tda2x，tda4x，x3/j3）。参考 cross_make + build_horizon 框架，编写 cross_make + build_bst。

框架 CMakeLists.txt：(fixed)

```
cmake_minimum_required(VERSION 2.8.3)
project(tauristar_platform)

execute_process(
        COMMAND git rev-parse --abbrev-ref HEAD
        WORKING_DIRECTORY ${PROJECT_SOURCE_DIR}
        OUTPUT_VARIABLE TS_GIT_BRANCH
        OUTPUT_STRIP_TRAILING_WHITESPACE
)

execute_process(
        COMMAND git log -1 --format=%h
        WORKING_DIRECTORY ${PROJECT_SOURCE_DIR}
        OUTPUT_VARIABLE TS_GIT_COMMIT_HASH
        OUTPUT_STRIP_TRAILING_WHITESPACE
)

execute_process(
        COMMAND git ls-files -m
        WORKING_DIRECTORY ${PROJECT_SOURCE_DIR}
        OUTPUT_VARIABLE TS_GIT_UNCOMMITTED_LIST
        OUTPUT_STRIP_TRAILING_WHITESPACE
)

string(REGEX REPLACE "\n" " + " TS_GIT_UNCOMMITTED_LIST
"${TS_GIT_UNCOMMITTED_LIST}")

add_compile_options(-std=c++11)
add_compile_options(-fext-numeric-literals)
# see https://gcc.gnu.org/onlinedocs/libstdc++/manual/using_dual_abi.html
#add_compile_options(-D__GLIBCXX_USE_CXX11_ABI=0)

list(APPEND CMAKE_MODULE_PATH ${PROJECT_SOURCE_DIR}/cmake)
#list(APPEND CMAKE_PREFIX_PATH ${PROJECT_SOURCE_DIR}/third_party)
list(APPEND CMAKE_PREFIX_PATH
${PROJECT_SOURCE_DIR}/third_party/g2o_9b41a4e/cmake_modules)

MESSAGE(STATUS "CMAKE_MODULE_PATH: ${CMAKE_MODULE_PATH}")
MESSAGE(STATUS "CMAKE_PREFIX_PATH: ${CMAKE_PREFIX_PATH}")


set(TAURISTAR_SRC_DIR ${CMAKE_CURRENT_SOURCE_DIR})
set(TAURISTAR_THIRD_PARTY ${PROJECT_SOURCE_DIR}/third_party)
```

```
SET(TAURISTAR_CORSS_COMPONENTS_DIR ${TAURISTAR_SRC_DIR}/cross_components)

SET(EXECUTABLE_OUTPUT_PATH ${CMAKE_BINARY_DIR}/bin)
SET(LIBRARY_OUTPUT_PATH ${CMAKE_BINARY_DIR}/lib)
SET(INCLUDE_OUTPUT_PATH ${CMAKE_BINARY_DIR}/include)

MESSAGE(STATUS "TAURISTAR_SRC_DIR: ${TAURISTAR_SRC_DIR}")
MESSAGE(STATUS "CMAKE_BINARY_DIR:  ${CMAKE_BINARY_DIR}")
MESSAGE(STATUS "TAURISTAR_THIRD_PARTY: ${TAURISTAR_THIRD_PARTY}")
MESSAGE(STATUS "TAURISTAR_CROSS_COMPONENTS_DIR:
${TAURISTAR_CORSS_COMPONENTS_DIR}")

# add_definitions(-DDEBUG)

include_directories(${INCLUDE_OUTPUT_PATH})

####################################
# Cmake options
####################################
OPTION(BUILD_STITCH "build stitch module" OFF)
OPTION(BUILD_WITH_OPENCV "build with opencv" ON)
OPTION(BUILD_WITH_HDMAP "build Lanelet2 HD map module" ON)
OPTION(BUILD_WITH_OLD_APA "build with apa_info_process" ON)
OPTION(BUILD_WITH_DATABASE "build database module" OFF)
OPTION(BUILD_WITH_LIBTORCH "build libtorch module PyTorch_c++_part" OFF)
# Inference request Opencv temporally.
OPTION(BUILD_WITH_SOFARPC "build multi-server sofaRPC communication based
on protobuf" OFF)
OPTION(BUILD_WITH_RINGBUFFER "input/output data buffer queue" OFF)
OPTION(BUILD_WITH_NEW_UI "build with new UI platform" OFF) ## sudo apt
install libglfw3-dev libglfw3
OPTION(BUILD_WITH_BVS "build bvs" OFF)
OPTION(BUILD_WITH_BAG "build with tauristarbag libraries" OFF)
OPTION(BUILD_WITH_MCU "build with mcu library" OFF)
OPTION(BUILD_WITH_VSLAM "build with vslam libraries" OFF)
OPTION(USE_PANGOLIN_VIEWER "Enable Pangolin Viewer" OFF) ## need sudo apt
install libglew-dev
OPTION(BUILD_WITH_ZEROMQ "build with zero mq and zmq_operations" OFF)
OPTION(BUILD_WITH_MNN "build with mnn" OFF)

####################################
# MNN support
####################################
IF (BUILD_WITH_MNN)
    set(MNN_INCLUDE_DIRS
${PROJECT_SOURCE_DIR}/third_party/MNN/x86/include)
    set(MNN_LIBRARIES_PATH ${PROJECT_SOURCE_DIR}/third_party/MNN/x86/lib)
    link_directories(${MNN_LIBRARIES_PATH})
    include_directories(${MNN_INCLUDE_DIRS})
    MESSAGE(STATUS "MNN_LIBRARIES_PATH: ${MNN_LIBRARIES_PATH}")
    MESSAGE(STATUS "MNN_INCLUDE_DIRS: ${MNN_INCLUDE_DIRS}")
    file(GLOB MNN_LIBS ${MNN_LIBRARIES_PATH}/*.so)
ENDIF ()

####################################
### cross_make
####################################
if (cross_make)
```

```
    message(WARNING "--> CROSS MARK 01")
    set(BUILD_CROSS_MAKE ON)
    if (BUILD_HORIZON)
        message(WARNING "--> HORIZON MARK 01")
    elseif (BUILD_BST)  # BST-M
        message(WARNING "--> BST MARK 01")
    else ()
        add_definitions("-DHAS_DRM")
    endif ()

    OPTION(BUILD_WITH_ROS "build ROS module" OFF)
    if (BUILD_HORIZON)
        message(WARNING "--> HORIZON MARK 02")
        OPTION(BUILD_WITH_ROSBRIDGECPP "build rosbridgecpp" OFF)
    elseif (BUILD_BST)  # BST-M
        message(WARNING "--> BST MARK 02")
        OPTION(BUILD_WITH_ROSBRIDGECPP "build rosbridgecpp" OFF)
    else ()
        OPTION(BUILD_WITH_ROSBRIDGECPP "build rosbridgecpp" ON)
    endif ()
    OPTION(BUILD_WITH_CAFFE "build caffe-jacinto app" OFF)
    OPTION(BUILD_WITH_BSD "build bsd app" OFF)

    #
    #build lib for linux arm running on a15 (vsdk)
    #
    # notes: regarding openssl
    #
PROCESSOR_SDK_VISION_03_05_00_00/ti_components/os_tools/linux/targetfs/usr/include/openssl
    #   find_package(OpenSSL REQUIRED) defines:
    #   ${OPENSSL_LIBRARIES} and ${OPENSSL_INCLUDE_DIR}
    #

    set(CURRENT_FOLDER ${CMAKE_CURRENT_SOURCE_DIR})
    MESSAGE(STATUS "current_folder: ${CURRENT_FOLDER}")
    MESSAGE(STATUS "BUILD_TDA2: ${BUILD_TDA2}")
    MESSAGE(STATUS "BUILD_TDA4: ${BUILD_TDA4}")
    MESSAGE(STATUS "BUILD_HORIZON: ${BUILD_HORIZON}")
    MESSAGE(STATUS "BUILD_BST: ${BUILD_BST}")  # BST-M
    MESSAGE(STATUS "TI_SW_ROOT: ${TI_SW_ROOT}")

    if (BUILD_TDA2)
        set(A15_Linux_OpenCV_PREBUILD_PATH ${TI_SW_ROOT}/open_compute/opencv/opencv-3.1.0)
        set(A15_Linux_OpenCV_INCLUDE_PATH ${A15_Linux_OpenCV_PREBUILD_PATH}/include)
        set(A15_Linux_OpenCV_LIB_PATH ${A15_Linux_OpenCV_PREBUILD_PATH}/psdk_opencv)
        set(Boost_INCLUDE_DIRS ${TAURISTAR_CORSS_COMPONENTS_DIR}/boost_1_60/include)
        set(Boost_LIBRARIES_PATH ${TAURISTAR_CORSS_COMPONENTS_DIR}/boost_1_60/lib)
        set(OPENSSL_INCLUDE_DIR ${TAURISTAR_CORSS_COMPONENTS_DIR}/openssl/include)
        set(OPENSSL_LIBRARIES_PATH ${TAURISTAR_CORSS_COMPONENTS_DIR}/openssl/lib)
```

```
142         set(TIOVX_DIR
    ${TI_SW_ROOT}/ti_components/open_compute/tiovx_01_00_01_00)
143         set(OpenVX_INCLUDE_DIRS
144                 ${TIOVX_DIR}/include
145                 ${TIOVX_DIR}/kernels/include
146                 ${TIOVX_DIR}/utils/include
147                 )
148         set(OpenVX_LIBS_DIR ${TIOVX_DIR}/lib/TDAX/A15/LINUX/release)
149         set(OpenVX_LIBS
150                 -lvx_tiovx_ivision_tests
151                 -lvx_tiovx_tests -lvx_conformance_tests -
    lvx_conformance_engine -lvx_conformance_tests_testmodule
152                 -lvx_vxu -lvx_framework
153                 -lvx_kernels_host_utils -lvx_kernels_ivision
154                 -lvx_platform_vision_sdk_linux
155                 -lvx_kernels_openvx_core
156                 -lvx_sample_usecases
157                 -lvx_tutorial
158                 )
159         IF (BUILD_WITH_MNN)
160             set(MNN_INCLUDE_DIRS
    ${PROJECT_SOURCE_DIR}/third_party/MNN/arm/include)
161             set(MNN_LIBRARIES_PATH
    ${PROJECT_SOURCE_DIR}/third_party/MNN/arm/lib)
162             link_directories(${MNN_LIBRARIES_PATH})
163             include_directories(${MNN_INCLUDE_DIRS})
164             MESSAGE(STATUS "MNN_LIBRARIES_PATH: ${MNN_LIBRARIES_PATH}")
165             MESSAGE(STATUS "MNN_INCLUDE_DIRS: ${MNN_INCLUDE_DIRS}")
166             file(GLOB MNN_LIBS ${MNN_LIBRARIES_PATH}/*.so)
167         ENDIF ()
168     endif ()
169
170     if (BUILD_TDA4)
171         set(TST_PREBUILD_PATH
    ${PROJECT_SOURCE_DIR}/third_party/install/aarch64)
172         set(A15_Linux_OpenCV_PREBUILD_PATH
    ${TST_PREBUILD_PATH}/opencv_v3.4.5)
173         set(A15_Linux_OpenCV_INCLUDE_PATH
    ${A15_Linux_OpenCV_PREBUILD_PATH}/include)
174         set(A15_Linux_OpenCV_LIB_PATH
    ${A15_Linux_OpenCV_PREBUILD_PATH}/lib)
175         set(Boost_INCLUDE_DIRS ${TST_PREBUILD_PATH}/boost_1_60_0/include)
176         set(Boost_LIBRARIES_PATH ${TST_PREBUILD_PATH}/boost_1_60_0/lib)
177         set(OPENSSL_INCLUDE_DIR ${TI_SW_ROOT}/targetfs/usr/include)
178         set(OPENSSL_LIBRARIES_PATH ${TI_SW_ROOT}/targetfs/usr/lib)
179         set(TIOVX_DIR ${TI_SW_ROOT}/tiovx)
180         set(OpenVX_INCLUDE_DIRS
181                 ${TIOVX_DIR}/include
182                 ${TIOVX_DIR}/kernels/include
183                 ${TIOVX_DIR}/utils/include
184                 )
185         set(OpenVX_LIBS_DIR ${TIOVX_DIR}/lib/J7/A72/LINUX/release)
186         set(OpenVX_LIBS
187                 -lvx_tiovx_tests -lvx_conformance_tests -
    lvx_conformance_engine -lvx_conformance_tests_testmodule
188                 -lvx_vxu -lvx_framework
189                 -lvx_kernels_host_utils -lvx_kernels_target_utils
190                 -lvx_platform_psdk_j7_linux
```

```
                -lvx_kernels_openvx_core
                -lvx_kernels_test_kernels_tests -lvx_kernels_test_kernels
                -lvx_target_kernels_source_sink
                -lvx_utils
                -lvx_kernels_hwa_tests -lvx_kernels_hwa -
lvx_tiovx_tidl_tests -lvx_kernels_tidl
                -lvx_tutorial
                )
    endif ()

    if (BUILD_HORIZON)
        message(WARNING "--> HORIZON MARK 03")
        set(Boost_INCLUDE_DIRS ${DEPS_ROOT}/boost/include)
        set(Boost_LIBRARIES_PATH ${DEPS_ROOT}/boost/lib)
        set(OPENSSL_INCLUDE_DIR ${DEPS_ROOT}/openssl/include)
        set(OPENSSL_LIBRARIES_PATH ${DEPS_ROOT}/openssl/lib)
        set(A15_Linux_OpenCV_INCLUDE_PATH ${DEPS_ROOT}/opencv/include)
        set(A15_Linux_OpenCV_LIB_PATH ${DEPS_ROOT}/opencv/lib)
    endif ()

    if (BUILD_BST)  # BST-M
        message(WARNING "--> BST MARK 03")
        set(Boost_INCLUDE_DIRS ${DEPS_ROOT}/boost/include)
        set(Boost_LIBRARIES_PATH ${DEPS_ROOT}/boost/lib)
        set(OPENSSL_INCLUDE_DIR ${DEPS_ROOT}/openssl/include)
        set(OPENSSL_LIBRARIES_PATH ${DEPS_ROOT}/openssl/lib)
        set(A15_Linux_OpenCV_INCLUDE_PATH ${DEPS_ROOT}/opencv/include)
        set(A15_Linux_OpenCV_LIB_PATH ${DEPS_ROOT}/opencv/lib)
    endif ()

    set(Boost_INCLUDE_DIR ${Boost_INCLUDE_DIRS})
    set(OpenCV_INCLUDE_DIRS ${A15_Linux_OpenCV_INCLUDE_PATH})

    set(OpenCV_LIBS_PATH ${A15_Linux_OpenCV_LIB_PATH})
    set(BOOST_LIBRARYDIR ${Boost_LIBRARIES_PATH})

    MESSAGE(STATUS "Boost_LIBRARIES_PATH: ${Boost_LIBRARIES_PATH}")
    MESSAGE(STATUS "Boost_INCLUDE_DIRS: ${Boost_INCLUDE_DIRS}")
    MESSAGE(STATUS "OpenCV_INCLUDE_DIRS: ${OpenCV_INCLUDE_DIRS}")
    MESSAGE(STATUS "OpenCV_LIBS_PATH: ${OpenCV_LIBS_PATH}")

    link_directories(${Boost_LIBRARIES_PATH})
    link_directories(${OpenCV_LIBS_PATH})
    link_directories(${TAURISTAR_CORSS_COMPONENTS_DIR}/libc)  #libm.so
    link_directories(${OPENSSL_LIBRARIES_PATH})

    include_directories(${Boost_INCLUDE_DIRS})
    include_directories(${OpenCV_INCLUDE_DIRS})
    include_directories(${OPENSSL_INCLUDE_DIR})

    add_compile_options(-fPIC)

    if (BUILD_HORIZON)
        message(WARNING "--> HORIZON MARK 04")
        set(CROSS_OpenCV_LIBS
                -lopencv_world
                )
        set(OpenCV_LIBS ${CROSS_OpenCV_LIBS})
```

```
248     elseif (BUILD_BST)  # BST-M
249         message(WARNING "--> BST MARK 04")
250         set(CROSS_OpenCV_LIBS
251                 -lopencv_world
252                 )
253     else ()
254         set(CROSS_OpenCV_LIBS
255                 -lopencv_calib3d
256                 -lopencv_core
257                 -lopencv_imgproc
258                 -lopencv_imgcodecs
259                 -lopencv_highgui
260                 -lopencv_features2d
261                 -lopencv_video
262                 -lopencv_videoio
263                 -lopencv_imgproc
264                 -lopencv_flann
265                 )
266         set(OpenCV_LIBS ${CROSS_OpenCV_LIBS})
267     endif ()
268
269
270     set(CROSS_Boost_LIBRARIES
271             -lboost_serialization
272             -lboost_system
273             -lboost_program_options
274             -lboost_thread
275             -lboost_filesystem
276             -lboost_regex
277             -lboost_date_time
278             )
279     set(Boost_LIBRARIES ${CROSS_Boost_LIBRARIES})
280
281     set(OPENSSL_LIBRARIES
282             -lssl
283             -lcrypto
284             )
285
286     ###################################
287     # Tauristar UI Engine
288     ###################################
289     if (BUILD_HORIZON)
290         message(WARNING "--> HORIZON MARK 05")
291     elseif (BUILD_BST)  # BST
292         message(WARNING "--> BST MARK 05")
293     else ()
294         #IF (BUILD_WITH_NEW_UI)
295         set(VSDK_SYS_PATH ${TARGET_FS_PATH})
296         set(VSDK_SYS_INCLUDE ${VSDK_SYS_PATH}/usr/include)
297         set(VSDK_SYS_LIB_PATH
298                 ${VSDK_SYS_PATH}/usr/lib
299                 ${VSDK_SYS_PATH}/lib
300                 )
301
302         link_directories(${VSDK_SYS_LIB_PATH})
303         include_directories(${VSDK_SYS_INCLUDE})
304         include_directories(${VSDK_SYS_INCLUDE}/drm)
305         include_directories(${VSDK_SYS_INCLUDE}/libdrm)
```

```
306         include_directories(${VSDK_SYS_INCLUDE}/omap)
307         include_directories(${VSDK_SYS_INCLUDE}/gbm)
308 
309         set(CROSS_EGL_LIBRARYES
310                 -lEGL
311                 -lGLESv2
312                 -lIMGegl
313                 -ldrm
314                 -ldrm_omap
315                 -lgbm
316                 )
317         set(EGL_LIBRARYES ${CROSS_EGL_LIBRARYES})
318     endif ()
319     #ENDIF()
320 
321 else ()  ################################### cross_make
322     message(WARNING "--> CROSS MARK 02")
323     set(BUILD_CROSS_MAKE OFF)
324     if (BUILD_HORIZON)
325         message(WARNING "--> HORIZON MARK 06")
326     elseif (BUILD_BST)  # BST-M
327         message(WARNING "--> BST MARK 06")
328     else ()
329         set(TST_PREBUILD_PATH
    ${PROJECT_SOURCE_DIR}/third_party/install/x86_64)
330     endif ()
331 
332     OPTION(BUILD_WITH_ROS "build ROS module" OFF)
333     if (BUILD_HORIZON)
334         message(WARNING "--> HORIZON MARK 07")
335         OPTION(BUILD_WITH_ROSBRIDGECPP "build rosbridgecpp" OFF)
336     elseif (BUILD_BST)  # BST-M
337         message(WARNING "--> BST MARK 07")
338         OPTION(BUILD_WITH_ROSBRIDGECPP "build rosbridgecpp" OFF)
339     else ()
340         OPTION(BUILD_WITH_ROSBRIDGECPP "build rosbridgecpp" ON)
341     endif ()
342     OPTION(BUILD_WITH_CAFFE "build caffe-jacinto app" OFF)
343     OPTION(BUILD_WITH_BSD "build bsd app" OFF)
344 
345     ####################################
346     # openssl
347     ####################################
348     if (APPLE)
349         set(OPENSSL_ROOT_DIR "/usr/local/opt/openssl")
350     endif ()
351     find_package(OpenSSL REQUIRED)
352 
353     ####################################
354     # Opencv
355     ####################################
356     #set(OpenCV_DIR
    "/home/marvin/work/ts/thirdparty/installdir/share/OpenCV")
357     set(OpenCV_DIR "/usr/local/opencv/opencv-3.4.5/share/OpenCV")
358     if (BUILD_HORIZON)
359         message(WARNING "--> HORIZON MARK 08")
360     elseif (BUILD_BST)  # BST-M
361         message(WARNING "--> BST MARK 08")
```

```
    else ()
        find_package(OpenCV REQUIRED)
    endif ()
    #set(OpenCV_INCLUDE_DIRS ${TST_PREBUILD_PATH}/opencv_v3.4.5/include)
    #set(OpenCV_LIBS_PATH ${TST_PREBUILD_PATH}/opencv_v3.4.5/lib)
    #set(OpenCV_LIBS
    #  -lopencv_calib3d
    #  -lopencv_core
    #  -lopencv_imgproc
    #  -lopencv_imgcodecs
    #  -lopencv_highgui
    #  -lopencv_features2d
    #  -lopencv_video
    #  -lopencv_videoio
    #  -lopencv_imgproc
    #  -lopencv_flann
    #)

    include_directories(${OpenCV_INCLUDE_DIRS})
    message(STATUS "OpenCV_DIR = ${OpenCV_DIR}")
    message(STATUS "OpenCV_INCLUDE_DIRS = ${OpenCV_INCLUDE_DIRS}")
    message(STATUS "OpenCV_LIBS_PATH = ${OpenCV_LIBS_PATH}")
    message(STATUS "OpenCV_LIBS = ${OpenCV_LIBS}")

    ####################################
    # Boost
    ####################################
    find_package(Boost REQUIRED COMPONENTS serialization system
program_options thread filesystem regex)

    ####################################
    # TIOVX
    ####################################
    set(TIOVX_DIR ${TAURISTAR_THIRD_PARTY}/openvx/tiovx)
    set(OpenVX_LIBS_DIR ${TIOVX_DIR}/lib/PC/x86_64/LINUX/release)
    set(OpenVX_INCLUDE_DIRS
            ${TIOVX_DIR}/include
            ${TIOVX_DIR}/kernels/include
            ${TIOVX_DIR}/utils/include
            )
    set(OpenVX_LIBS_DIR ${TIOVX_DIR}/lib/PC/x86_64/LINUX/release)
    set(OpenVX_LIBS
            -lvx_vxu
            -lvx_framework
            -lvx_platform_pc
            -lvx_kernels_openvx_core
            -lvx_target_kernels_openvx_core
            -lvx_kernels_host_utils
            -lvx_kernels_target_utils
            -lvx_kernels_tidl
            -lvx_kernels_hwa
            -lvx_kernels_hwa_tests
            -lvx_kernels_test_kernels
            -lvx_kernels_test_kernels_tests
            -lvx_target_kernels_tidl
            -lvx_target_kernels_c66
            -lvx_target_kernels_dmpac_dof
            -lvx_target_kernels_dmpac_sde
```

```
            -lvx_target_kernels_ivision_common
            -lvx_target_kernels_j7_arm
            -lvx_target_kernels_source_sink
            -lvx_target_kernels_tutorial
            -lvx_target_kernels_vpac_ldc
            -lvx_target_kernels_vpac_msc
            -lvx_target_kernels_vpac_nf
            -lvx_target_kernels_vpac_viss
            -lvx_sample_usecases
            -lvx_tiovx_tests
            -lvx_tiovx_tidl_tests
            -lvx_utils
            -lc6xsim_x86_64_C66
            -lvxlib_x86_64
            )

endif () ###################################  End of cross_make
message(WARNING "--> CROSS MARK 03")

set(CMAKE_CONFIG_FILE "${PROJECT_SOURCE_DIR}/basic_util/cmake_config.h")
set(CMAKE_CONFIG_FILE_OUT "${INCLUDE_OUTPUT_PATH}/cmake_config.h")
configure_file("${CMAKE_CONFIG_FILE}.in" "${CMAKE_CONFIG_FILE_OUT}")

configure_file(
        ${PROJECT_SOURCE_DIR}/version.h.in
        ${INCLUDE_OUTPUT_PATH}/tauristar_version.h
)

MESSAGE(STATUS "option: BUILD_WITH_ROS=${BUILD_WITH_ROS}")
MESSAGE(STATUS "option: BUILD_WITH_OPENCV=${BUILD_WITH_OPENCV}")
MESSAGE(STATUS "option: BUILD_WITH_HDMAP=${BUILD_WITH_HDMAP}")
MESSAGE(STATUS "option: BUILD_WITH_DATABASE=${BUILD_WITH_DATABASE}")
MESSAGE(STATUS "option: BUILD_WITH_LIBTORCH=${BUILD_WITH_LIBTORCH}")
MESSAGE(STATUS "option: BUILD_WITH_SOFARPC=${BUILD_WITH_SOFARPC}")
MESSAGE(STATUS "option:
BUILD_WITH_ROSBRIDGECPP=${BUILD_WITH_ROSBRIDGECPP}")
MESSAGE(STATUS "option: BUILD_WITH_CAFFE=${BUILD_WITH_CAFFE}")
MESSAGE(STATUS "option: BUILD_WITH_BSD=${BUILD_WITH_BSD}")
MESSAGE(STATUS "option: BUILD_WITH_RINGBUFFER=${BUILD_WITH_RINGBUFFER}")
MESSAGE(STATUS "option: BUILD_WITH_NEW_UI=${BUILD_WITH_NEW_UI}")
MESSAGE(STATUS "option: BUILD_CROSS_MAKE=${BUILD_CROSS_MAKE}")
MESSAGE(STATUS "option: BUILD_WITH_MCU=${BUILD_WITH_MCU}")
MESSAGE(STATUS "option: BUILD_WITH_VSLAM=${BUILD_WITH_VSLAM}")
MESSAGE(STATUS "option: USE_PANGOLIN_VIEWER=${USE_PANGOLIN_VIEWER}")
MESSAGE(STATUS "option: BUILD_WITH_ZEROMQ=${BUILD_WITH_ZEROMQ}")
MESSAGE(STATUS "option: BUILD_WITH_MNN=${BUILD_WITH_MNN}")

####################################
# protobuf v2.6.1
#  ${PROTOBUF_LIBRARY}
####################################
#add_subdirectory (${PROJECT_SOURCE_DIR}/third_party/Protobuf)
#set(PROTOBUF_INCLUDE_DIR
${PROJECT_SOURCE_DIR}/third_party/Protobuf/protobuf/src/google/protobuf)
#set(PROTOBUF_LIBRARY libprotobuf)
#include_directories(${PROTOBUF_INCLUDE_DIR})
```

```
475 ###################################
476 # Eigen 3.  Put Eigen at very early because most of thirdparty or
    tauristar libraries will need it.
477 ###################################
478 if (cross_make)
479     message(WARNING "--> CROSS MARK 04")
480     if (BUILD_HORIZON)
481         message(WARNING "--> HORIZON MARK 09")
482         set(EIGEN3_INCLUDE_DIRS ${DEPS_ROOT}/eigen3/include/eigen3)
483     elseif (BUILD_BST)  # BST-M
484         message(WARNING "--> BST MARK 09")
485         set(EIGEN3_INCLUDE_DIRS ${DEPS_ROOT}/eigen3/include/eigen3)
486     else ()
487         set(EIGEN3_INCLUDE_DIRS
    ${TAURISTAR_SRC_DIR}/cross_components/eigen3)
488     endif ()
489     set(EIGEN3_INCLUDE_DIR ${EIGEN3_INCLUDE_DIRS})
490 else ()
491     set(EIGEN3_INCLUDE_DIRS ${PROJECT_SOURCE_DIR}/third_party/eigen3)
492     set(EIGEN3_INCLUDE_DIR ${EIGEN3_INCLUDE_DIRS})
493 endif ()
494
495 include_directories(${EIGEN3_INCLUDE_DIRS})
496 message(STATUS "EIGEN3_INCLUDE_DIRS = ${EIGEN3_INCLUDE_DIRS}")
497
498
499 ###################################
500 # Thirdparty: OpenVslam, TauristarBag.
501 ###################################
502 IF (BUILD_WITH_VSLAM)
503
     include_directories("${PROJECT_SOURCE_DIR}/third_party/g2o_9b41a4e/g2o/c
    ore")
504     include_directories("${PROJECT_SOURCE_DIR}/third_party/g2o_9b41a4e")
505     include_directories("${PROJECT_BINARY_DIR}/third_party/g2o_9b41a4e")
506
     include_directories("${PROJECT_SOURCE_DIR}/third_party/DBoW2/include")
507 ENDIF () # BUILD_WITH_VSLAM
508 IF (BUILD_WITH_VSLAM OR BUILD_WITH_BAG)
509     add_subdirectory(${PROJECT_SOURCE_DIR}/third_party)
510 ENDIF ()
511
512
513 ###################################
514 # yaml cpp, 0.6.2
515 ###################################
516 message(STATUS "add_subdirectory: " ${PROJECT_SOURCE_DIR}/third_party)
517 add_subdirectory(${PROJECT_SOURCE_DIR}/third_party/yaml-cpp)
518 include_directories("${PROJECT_SOURCE_DIR}/third_party/yaml-cpp/include")
519
520 add_subdirectory(${PROJECT_SOURCE_DIR}/third_party/spdlog)
521 include_directories("${PROJECT_SOURCE_DIR}/third_party/spdlog/include")
522
523 IF (BUILD_WITH_ROSBRIDGECPP)
524     include_directories(${PROJECT_SOURCE_DIR}/third_party/rosbridgecpp)
525     add_subdirectory(${PROJECT_SOURCE_DIR}/third_party/rosbridgecpp
    rosbridgecpp)
526     set(ROSBRIDGECPP rosbridgecpp)
```

```
527 ENDIF ()
528
529 IF (BUILD_WITH_OPENCV)
530     add_subdirectory(${PROJECT_SOURCE_DIR}/third_party/grid_map-
    1.6.0/grid_map_cv)
531 ENDIF ()
532
533 IF (BUILD_WITH_CAFFE)
534     set(BUILD_WITH_CUDA ON)
535     find_package(CUDA)
536     find_package(Caffe)
537     include_directories(${Caffe_INCLUDE_DIRS})
538 else ()
539     set(BUILD_WITH_CUDA OFF)
540 ENDIF ()
541
542
543 ####################################
544 # grid_map, 1.6.0
545 ####################################
546 add_subdirectory(${PROJECT_SOURCE_DIR}/third_party/grid_map-
    1.6.0/grid_map_core)
547
548 include_directories(
549         ${PROJECT_SOURCE_DIR}/third_party/grid_map-
    1.6.0/grid_map_core/include
550 )
551
552 ####################################
553 # lanelet2 for hdmap support
554 ####################################
555 IF (BUILD_WITH_HDMAP)
556     add_subdirectory(${PROJECT_SOURCE_DIR}/third_party/lanelet2)
557 ENDIF ()
558
559
560 ####################################
561 # basic includes
562 ####################################
563
564 ## A set of include directories.
565 include_directories("${PROJECT_SOURCE_DIR}")
566 include_directories("${PROJECT_SOURCE_DIR}/include/")
567 #include_directories ("${PROJECT_SOURCE_DIR}")
568 include_directories("${PROJECT_SOURCE_DIR}/basic_util/")
569 include_directories("${PROJECT_SOURCE_DIR}/basic_util/camera_util")
570 include_directories("${PROJECT_SOURCE_DIR}/basic_util/layer_util")
571 include_directories("${PROJECT_SOURCE_DIR}/basic_util/amathutils_lib/incl
    ude")
572 include_directories("${PROJECT_SOURCE_DIR}/basic_util/state_machine_lib/i
    nclude")
573 include_directories("${PROJECT_SOURCE_DIR}/basic_util/system_util/gzip-
    hpp/include")
574 include_directories("${PROJECT_SOURCE_DIR}/tauristar_geometry/include")
575 include_directories("${PROJECT_SOURCE_DIR}/procedure/")
576 include_directories("${PROJECT_SOURCE_DIR}/flow_processor/")
577 include_directories("${PROJECT_SOURCE_DIR}/tauristar_mpc_solver/src")
578 include_directories(${PROJECT_SOURCE_DIR}/apa_full_stack)
```

```
include_directories(${PROJECT_SOURCE_DIR}/tauristar_operations)
include_directories(${PROJECT_SOURCE_DIR}/tauristar_operations/opencv_module)

###################################
# CAFFE
###################################

IF (BUILD_WITH_CAFFE)
    add_definitions("-DUSE_CAFFE")
    include_directories(${PROJECT_SOURCE_DIR}/caffe_module)
    add_subdirectory(${PROJECT_SOURCE_DIR}/caffe_module)
ENDIF ()


#################################################
# IMPORTANT:
#   build order: basic/less dependent libs first
#################################################

###################################
# basic_util and procedure
###################################
add_subdirectory("${PROJECT_SOURCE_DIR}/basic_util")
set(TAURISTAR_BASE_LIBS
        basic_util
        state_machine_lib
        )

###################################
# mcu lib
###################################
IF (BUILD_WITH_MCU)
    add_subdirectory(${PROJECT_SOURCE_DIR}/mcu_util_lib)

    include_directories(
            ${PROJECT_SOURCE_DIR}/mcu_util_lib
    )


    # set(TAURISTAR_OPERATION_LIBS
    #     mcu_operations_lib
    #     ${TAURISTAR_OPERATION_LIBS}
    #     )

ENDIF ()

###################################
# Odoemtry Localization
###################################
message(STATUS "add_subdirectory: "
${PROJECT_SOURCE_DIR}/tauristar_localization)
add_subdirectory("${PROJECT_SOURCE_DIR}/tauristar_localization")
include_directories("${PROJECT_SOURCE_DIR}/tauristar_localization/library
")
set(TAURISTAR_BASE_LIBS
        drlib
        ${TAURISTAR_BASE_LIBS}
```

```
634         )
635
636 ###################################
637 # tauristar processor
638 ###################################
639 add_subdirectory("${PROJECT_SOURCE_DIR}/procedure")
640 set(TAURISTAR_BASE_LIBS
641         tauristar_procedure
642         ${TAURISTAR_BASE_LIBS}
643         )
644
645 ###################################
646 # MPC controller
647 ###################################
648 message(STATUS "add_subdirectory: "
    ${PROJECT_SOURCE_DIR}/tauristar_mpc_solver)
649 add_subdirectory("${PROJECT_SOURCE_DIR}/tauristar_mpc_solver")
650 set(TAURISTAR_BASE_LIBS
651         mpc_controller_lib
652         ${TAURISTAR_BASE_LIBS}
653         )
654
655 ###################################
656 # Tauristar geometry
657 ###################################
658 message(STATUS "add_subdirectory: "
    ${PROJECT_SOURCE_DIR}/tauristar_geometry)
659 add_subdirectory("${PROJECT_SOURCE_DIR}/tauristar_geometry")
660 set(TAURISTAR_BASE_LIBS
661         tauristar_geometry
662         ${TAURISTAR_BASE_LIBS}
663         )
664
665 ###################################
666 # Motion Planner
667 ###################################
668 message(STATUS "add_subdirectory: "
    ${PROJECT_SOURCE_DIR}/tauristar_motion_planner)
669 add_subdirectory("${PROJECT_SOURCE_DIR}/tauristar_motion_planner")
670 include_directories("${PROJECT_SOURCE_DIR}/tauristar_motion_planner/inclu
    de")
671 set(TAURISTAR_BASE_LIBS
672         motion_planner
673         ${TAURISTAR_BASE_LIBS}
674         )
675
676
677 ###################################
678 # Simple reeds_shepp planner
679 ###################################
680 message(STATUS "add_subdirectory: "
    ${PROJECT_SOURCE_DIR}/simple_path_planner)
681 add_subdirectory("${PROJECT_SOURCE_DIR}/simple_path_planner")
682 include_directories("${PROJECT_SOURCE_DIR}/simple_path_planner/include")
683 set(TAURISTAR_BASE_LIBS
684         ${TAURISTAR_BASE_LIBS}
685         simple_path_planner
686         )
```

```
687
688 ###################################
689 # perception
690 ###################################
691 message(STATUS "add_subdirectory: "
    ${PROJECT_SOURCE_DIR}/tauristar_perception)
692 add_subdirectory(${PROJECT_SOURCE_DIR}/tauristar_perception)
693
694 set(TAURISTAR_AVM_LIBS
695         lib_avm_dcal
696         lib_avm
697         lib_avm_bvc
698         lib_avm_calib
699         lib_avm_algobase
700         lib_avm_util
701         )
702
703 IF (BUILD_WITH_BSD)
704     set(TAURISTAR_BSD_LIBS
705             bsdlib
706             )
707 ENDIF ()
708
709 set(TAURISTAR_FCW_LIBS
710         fcw
711         )
712
713 set(TAURISTAR_BASE_LIBS
714         ${TAURISTAR_FCW_LIBS}
715         ${TAURISTAR_BSD_LIBS}
716         ${TAURISTAR_AVM_LIBS}
717         ${TAURISTAR_BASE_LIBS}
718         )
719
720 ###################################
721 # apa
722 ###################################
723 message(STATUS "add_subdirectory: " ${PROJECT_SOURCE_DIR}/apa_full_stack)
724 add_subdirectory("${PROJECT_SOURCE_DIR}/apa_full_stack")
725 include_directories("${PROJECT_SOURCE_DIR}/tauristar_perception/tauristar
    _avm/library")
726 set(TAURISTAR_BASE_LIBS
727         apa_info_process
728         ${TAURISTAR_BASE_LIBS}
729         )
730
731 ###################################
732 # bvs
733 ###################################
734 IF (BUILD_WITH_BVS)
735     message(STATUS "add_subdirectory: "
    ${PROJECT_SOURCE_DIR}/tauristar_bvs)
736     add_subdirectory("${PROJECT_SOURCE_DIR}/tauristar_bvs")
737     set(TAURISTAR_BASE_LIBS
738             bvs
739             ${TAURISTAR_BASE_LIBS}
740             )
741 ENDIF ()
```

```
742
743 ####################################
744 # flow_processor
745 ####################################
746
747 set(PROCESSOR_NODE "processor_node")
748 set(PROCESSOR_SRC_DIR "${PROJECT_SOURCE_DIR}/flow_processor/")
749
750 #set (PROCESSOR_APA "processor_apa")
751 #set (PROCESSOR_APA_SRC_DIR "${PROJECT_SOURCE_DIR}/apa_full_stack/")
752
753
754 ########### Database module ###########
755 IF (BUILD_WITH_DATABASE)
756     add_subdirectory(${PROJECT_SOURCE_DIR}/third_party/SQLiteCpp)
757     add_subdirectory(${PROJECT_SOURCE_DIR}/database_module)
758     include_directories(${PROJECT_SOURCE_DIR}/database_module)
759     set(TAURISTAR_BASE_LIBS
760             database_module
761             ${TAURISTAR_BASE_LIBS}
762             )
763
764     ## There is some link problem, so not put the ops_src inside
    ADVANCE_LIBS.
765     set(TAURISTAR_ADVANCE_OPS_SRC
766             ${PROJECT_SOURCE_DIR}/database_module/sqlite_operations.cpp
767             ${TAURISTAR_ADVANCE_OPS_SRC}
768             )
769 ENDIF ()
770
771 ########### c++ PyTorch module (LibTorch) ###########
772
773 # Temporally, LibTorch need Opencv
774 IF (BUILD_WITH_LIBTORCH)
775
776
777     add_subdirectory(${PROJECT_SOURCE_DIR}/libtorch_module)
778     include_directories(${PROJECT_SOURCE_DIR}/libtorch_module)
779     set(TAURISTAR_BASE_LIBS
780             libtorch_module
781             ${TAURISTAR_BASE_LIBS}
782             )
783     ## There is some link problem, so not put the ops_src inside
    ADVANCE_LIBS.
784     set(TAURISTAR_ADVANCE_OPS_SRC
785             ${PROJECT_SOURCE_DIR}/libtorch_module/libtorch_operations.cpp
786             ${TAURISTAR_ADVANCE_OPS_SRC}
787             )
788 ENDIF ()
789
790
791 ########### c++ SLAM module ###########
792 IF (BUILD_WITH_VSLAM)
793
794     add_subdirectory(${PROJECT_SOURCE_DIR}/marker_slam_module)
795     include_directories(${PROJECT_SOURCE_DIR}/marker_slam_module)
796
797     add_subdirectory(${PROJECT_SOURCE_DIR}/visual_slam_module)
```

```
    include_directories(${PROJECT_SOURCE_DIR}/visual_slam_module)

    set(TAURISTAR_BASE_LIBS
            visual_slam_lib
            marker_slam_lib
            ${TAURISTAR_BASE_LIBS}
            )

ENDIF ()

####################################
# gridmap module
####################################
add_subdirectory(${PROJECT_SOURCE_DIR}/tauristar_gridmap)
include_directories(${PROJECT_SOURCE_DIR}/tauristar_gridmap)
set(TAURISTAR_BASE_LIBS
        tauristar_gridmap
        ${TAURISTAR_BASE_LIBS}
        )

####################################
# HD_gridmap module based on gridmap core 1.6.0
####################################

IF (BUILD_WITH_HDMAP)

    ###################################
    # Lanelet2 HD map based on lanelet2
    ###################################
    add_subdirectory(${PROJECT_SOURCE_DIR}/lanelet2_extension)

    # message(STATUS "add_subdirectory: "
${PROJECT_SOURCE_DIR}/third_party/grid_map_core)
    # add_subdirectory
("${PROJECT_SOURCE_DIR}/third_party/grid_map_core")

    add_subdirectory(${PROJECT_SOURCE_DIR}/tauristar_HDgridmap)

 include_directories(${PROJECT_SOURCE_DIR}/third_party/lanelet2/lanelet2_
io/include)

 include_directories(${PROJECT_SOURCE_DIR}/third_party/lanelet2/lanelet2_
core/include)
    include_directories(${PROJECT_SOURCE_DIR}/lanelet2_extension/include)
    include_directories(${PROJECT_SOURCE_DIR}/tauristar_HDgridmap)

    #add_definitions(-DBUILD_WITH_HDMAP)

    set(TAURISTAR_BASE_LIBS
            tauristar_hd_gridmap
            grid_map_core
            ${TAURISTAR_BASE_LIBS}
            lanelet2_extension_lib
            lanelet2_core
            lanelet2_io
            #     lanelet2_maps # no library for it.
            lanelet2_projection
            lanelet2_routing
```

```
850             lanelet2_traffic_rules
851             GeographicLib_SHARED
852             pugixml
853             )
854
855
856 ENDIF ()
857
858
859 ###################################
860 # Tauristar operations
861 ###################################
862 set(TAURISTAR_OPERATION_LIBS
863         tauristar_operations
864         ${TAURISTAR_OPERATION_LIBS}
865         )
866
867 message(STATUS "add_subdirectory: "
    ${PROJECT_SOURCE_DIR}/tauristar_operations)
868 add_subdirectory("${PROJECT_SOURCE_DIR}/tauristar_operations")
869 set(TAURISTAR_BASE_LIBS
870         -Wl,--whole-archive ${TAURISTAR_OPERATION_LIBS}
871         -Wl,--no-whole-archive
872         ${TAURISTAR_BASE_LIBS}
873         )
874
875 ###################################
876 # tauristar processor
877 ###################################
878 add_subdirectory("${PROJECT_SOURCE_DIR}/flow_processor")
879 set(TAURISTAR_BASE_LIBS
880         tauristar_flowprocessor
881         ${TAURISTAR_BASE_LIBS}
882         )
883
884
885 ###################################
886 # ROS module
887 ###################################
888
889 IF (BUILD_WITH_ROS)
890     find_package(catkin REQUIRED COMPONENTS
891             cmake_modules
892             tauristar_msgs
893             roscpp
894             sensor_msgs
895             cv_bridge
896             std_msgs
897             nav_msgs
898             tf
899             pcl_conversions
900             pcl_ros
901             )
902     include_directories(${catkin_INCLUDE_DIRS})
903     catkin_package(
904             CATKIN_DEPENDS tauristar_msgs tauristar_generic roscpp
    cv_bridge sensor_msgs std_msgs nav_msgs tf
905             DEPENDS Boost
```

```
    )
    include_directories("${PROJECT_SOURCE_DIR}/ros_module/")

    add_subdirectory(${PROJECT_SOURCE_DIR}/ros_module/)

ELSE ()

    set(ROS_OPERATION_SRC) ## Empty
ENDIF ()


###################################
# Tauristar UI Engine
###################################


IF (BUILD_WITH_NEW_UI)

    add_subdirectory("${PROJECT_SOURCE_DIR}/TauristarUI_Engine")

    set(TAURISTAR_OPERATION_LIBS
            ts_ui_operations
            ${TAURISTAR_OPERATION_LIBS}
            )
ENDIF ()

# Executable
#     "${PROCESSOR_SRC_DIR}/TauriStarTruck.cpp"
set(PROCESSOR_NODE_COMMON_SRC
        "${PROCESSOR_SRC_DIR}/main.cpp")

add_executable(${PROCESSOR_NODE}
        ${PROCESSOR_NODE_COMMON_SRC}
        )

message("TAURISTAR_BASE_LIBS:  ${TAURISTAR_BASE_LIBS}")
message("Boost libraries:  ${Boost_LIBRARIES}")

IF (BUILD_WITH_ROS)

    IF (BUILD_WITH_HDMAP)
        set(TAURISTAR_BASE_LIBS
                ros_lanelet2_ext_lib
                ${TAURISTAR_BASE_LIBS})
    ENDIF ()

    add_dependencies(${PROCESSOR_NODE} ${catkin_EXPORTED_TARGETS})
    target_link_libraries(${PROCESSOR_NODE}
            -Wl,--whole-archive ros_ops_lib
            -Wl,--no-whole-archive
            ros_module_lib # This library depends on some geometry lib
like tauristar_geometry.
            ${TAURISTAR_BASE_LIBS}
            ${ROSBRIDGECPP}
            ${OPENSSL_LIBRARIES}
            pthread
            ${catkin_LIBRARIES}
            yaml-cpp
```

```
963             ${OpenCV_LIBS}
964             #/usr/lib/x86_64-linux-gnu/libtiff.so.5
965             )
966 ELSE ()
967
968     #add_executable (${PROCESSOR_APA}
969     #    ${PROCESSOR_APA_SRC_DIR}/main_tsp.cpp
970     #)
971
972     #if(cross_make)
973     #IF (BUILD_WITH_NEW_UI)
974     ##bvs lib
975     #set (PROCESSOR_NODE_BVS_LIB "bvs")
976     #set (PROCESSOR_NODE_BVS_LIB_SRC
977     #    "${PROCESSOR_SRC_DIR}/bvs_win.cpp")
978     #
979     #add_library(${PROCESSOR_NODE_BVS_LIB}
980     #    ${PROCESSOR_NODE_BVS_LIB_SRC}
981     #)
982     #ENDIF()
983     #endif()
984
985     if (cross_make)   ################################### cross_make
libraries.
986         message(WARNING "--> CROSS MARK 05")
987         target_link_libraries(${PROCESSOR_NODE}
988                 ${TAURISTAR_BASE_LIBS}
989                 ${ROSBRIDGECPP}
990                 ${OPENSSL_LIBRARIES}
991                 pthread
992                 tauristar-yaml-cpp
993                 ${CROSS_Boost_LIBRARIES}
994                 ${CROSS_OpenCV_LIBS}
995                 atomic
996                 )
997
998         #IF (BUILD_WITH_NEW_UI)
999         #target_link_libraries (
1000        #         ${TAURISTAR_BASE_LIBS}
1001        #         ${ROSBRIDGECPP}
1002        #         ${OPENSSL_LIBRARIES}
1003        #         pthread
1004        #         tauristar-yaml-cpp
1005        #         ${CROSS_Boost_LIBRARIES}
1006        #         ${CROSS_OpenCV_LIBS}
1007        #         ${CROSS_EGL_LIBRARYES}
1008        #         atomic
1009        #)
1010        #ENDIF()
1011
1012        #target_link_libraries (${PROCESSOR_APA}
1013        #         ${TAURISTAR_BASE_LIBS}
1014        #         ${ROSBRIDGECPP}
1015        #         ${OPENSSL_LIBRARIES}
1016        #         pthread
1017        #         tauristar-yaml-cpp
1018        #         ${CROSS_Boost_LIBRARIES}
1019        #         ${CROSS_OpenCV_LIBS}
```

```
1020        #        atomic
1021        #)
1022    else () ################################### cross_make
1023
1024        message(WARNING "--> CROSS MARK 06")
1025        MESSAGE(STATUS "link binary libraries")
1026
1027        target_link_libraries(${PROCESSOR_NODE}
1028                ${TAURISTAR_BASE_LIBS}
1029                ${ROSBRIDGECPP}
1030                ${Caffe_LIBRARIES}
1031                ${OpenCV_LIBS}
1032                #/usr/lib/x86_64-linux-gnu/libtiff.so.5
1033                yaml-cpp
1034                ${Boost_LIBRARIES}
1035                ${OPENSSL_LIBRARIES}
1036                ${G2O_LIBS}
1037                pthread
1038                atomic
1039                )
1040        #target_link_libraries (${PROCESSOR_APA}
1041        #        ${TAURISTAR_BASE_LIBS}
1042        #        ${ROSBRIDGECPP}
1043        #        ${Caffe_LIBRARIES}
1044        #        ${OpenCV_LIBS}
1045        #        #/usr/lib/x86_64-linux-gnu/libtiff.so.5
1046        #        yaml-cpp
1047        #        ${Boost_LIBRARIES}
1048        #        ${OPENSSL_LIBRARIES}
1049        #        ${G2O_LIBS}
1050        #        pthread
1051        #        atomic
1052        #)
1053    endif () ################################### cross_make
1054
1055ENDIF () ################################### BUILD_WITH_ROS
1056
1057
1058# Flags
1059set_target_properties(${PROCESSOR_NODE} PROPERTIES COMPILE_FLAGS "-Wall -
    Wfloat-equal -Wshadow")
1060
1061
1062# ROS requires the latest C++ standard to compile without warnings.
    Disable some of them explicitly.
1063set_target_properties(${PROCESSOR_NODE} PROPERTIES COMPILE_FLAGS "-Wno-
    variadic-macros -Wno-long-long")
1064
1065
1066#############
1067## Install ##
1068#############
1069
1070IF (BUILD_WITH_ROS)
1071
1072    install(TARGETS ${PROCESSOR_NODE} ${TS_QP_SOLVER}
1073            ARCHIVE DESTINATION ${CATKIN_PACKAGE_LIB_DESTINATION}
1074            LIBRARY DESTINATION ${CATKIN_PACKAGE_LIB_DESTINATION}
```

```
            RUNTIME DESTINATION ${CATKIN_PACKAGE_BIN_DESTINATION}
            )

ELSE ()
    # install(TARGETS ${PROCESSOR_NODE})
ENDIF ()

```

TSP 需要关注的 point：

CROSS MARK	01		03	04	05					
BST-M	01	02	03	04	05				09	

BST docker 需要关注的 point：

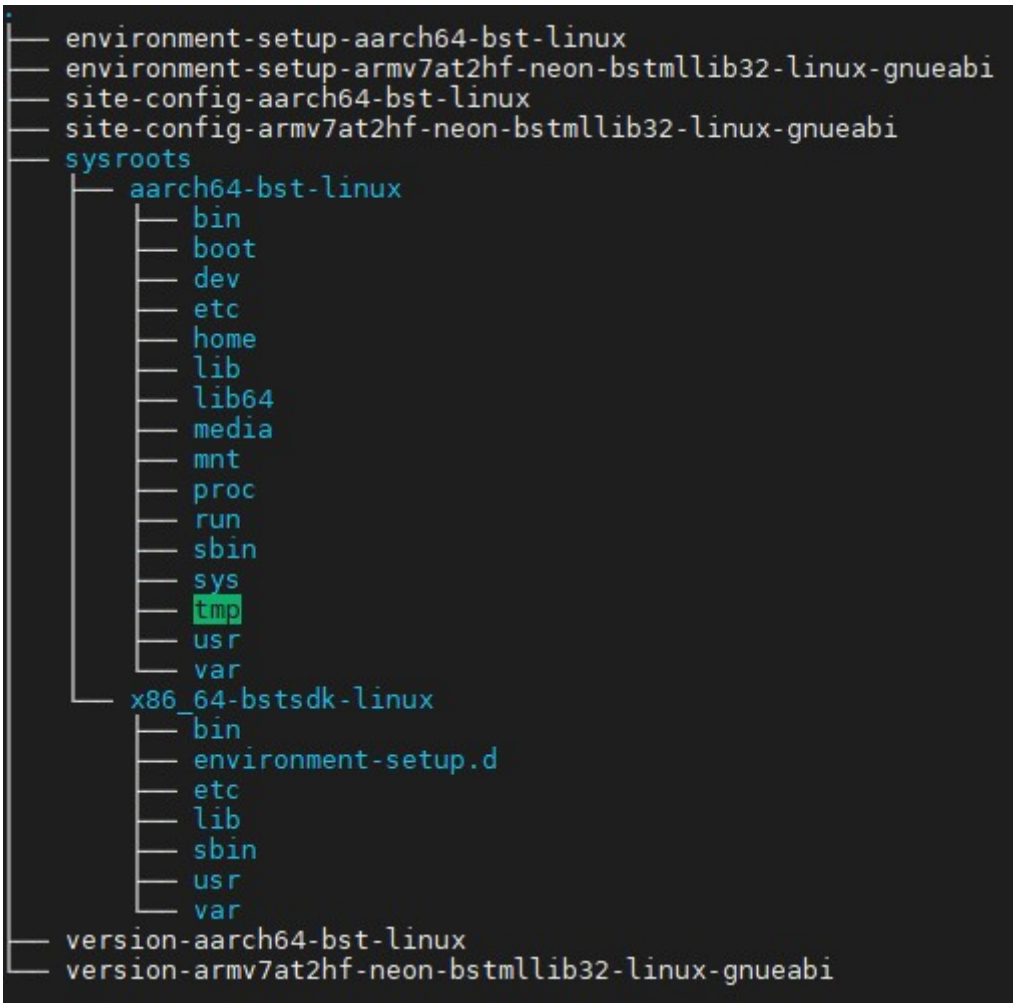
S.NO.	ITEM	LOCATION
01	gcc	
02	g++	
03	boost	
04	openssl	
05	opencv	

补充：

gcc-g++：

```
# 来源：
# BST-OS-SDK用户指南-v1.1.2：
# https://dev.bstai.top/b/BST-OS-SDK-user-guide-v1.1.2/index.html

GNU编译器套件包括gcc,g++;

aarch64-bst-linux-gcc (GCC) 8.3.0
aarch64-bst-linux-g++ (GCC) 8.3.0

which aarch64-bst-linux-gcc
/{install_path}/sysroots/x86_64-bstsdk-linux/usr/bin/aarch64-bst-linux/aarch64-bst-linux-gcc

which aarch64-bst-linux-g++
/{install_path}/sysroots/x86_64-bstsdk-linux/usr/bin/aarch64-bst-linux/aarch64-bst-linux-g++

root@127695fedbec:/# which aarch64-bst-linux-gcc
/opt/bstos/1.1.2.1/sysroots/x86_64-bstsdk-linux/usr/bin/aarch64-bst-linux/aarch64-bst-linux-gcc
```

```
root@127695fedbec:/# which aarch64-bst-linux-g++
/opt/bstos/1.1.2.1/sysroots/x86_64-bstsdk-linux/usr/bin/aarch64-bst-linux/aarch64-bst-linux-g++
```

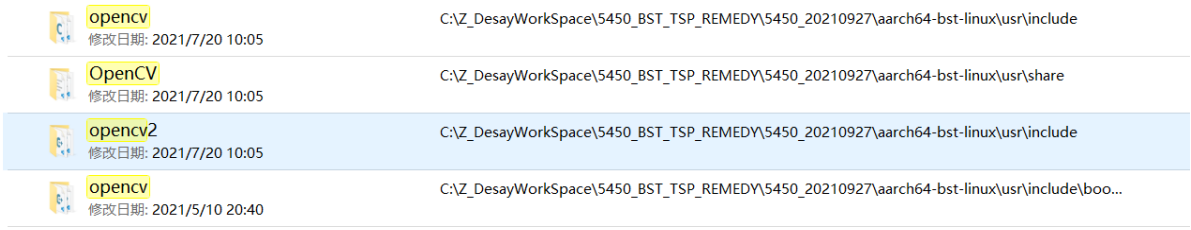


模块：

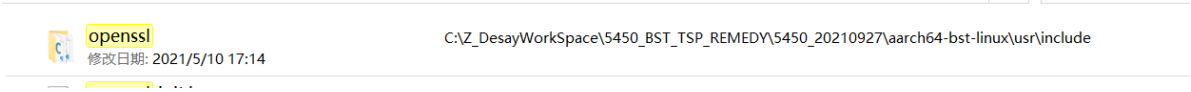
```
# 来源：
# BST-Platform-SDK用户指南-v1.1.2
# https://dev.bstai.top/b/BST-platform-SDK-user-guide-v1.1.2/use/module.html

BST提供SDK的docker部署方式，假设SDK版本0.8.1，成功部署docker环境后：

    库文件目录：/opt/bstos/0.8.1/sysroots/aarch64-bst-linux/usr/lib64/，

    执行文件目录：/opt/bstos/0.8.1/sysroots/aarch64-bst-linux/usr/bin/，

    头文件目录：/opt/bstos/0.8.1/sysroots/aarch64-bst-linux/usr/include/，

    示例代码目录：/opt/bstos/0.8.1/sysroots/aarch64-bst-linux/usr/include/src/，

以default-image为例说明BST-Platform各个模块 ，包括模块运行依赖的所有库文件，执行文件，配置文件等，模块是否默认集成进BST-OS。


```

```
# opencv:
..aarch64-bst-linux\usr\include\opencv

# opencv2:
..aarch64-bst-linux\usr\include\opencv2

# openssl:
..aarch64-bst-linux\usr\include\openssl

# boost:
..aarch64-bst-linux\usr\include\boost

# eigen3:
..aarch64-bst-linux\usr\include\eigen3
```

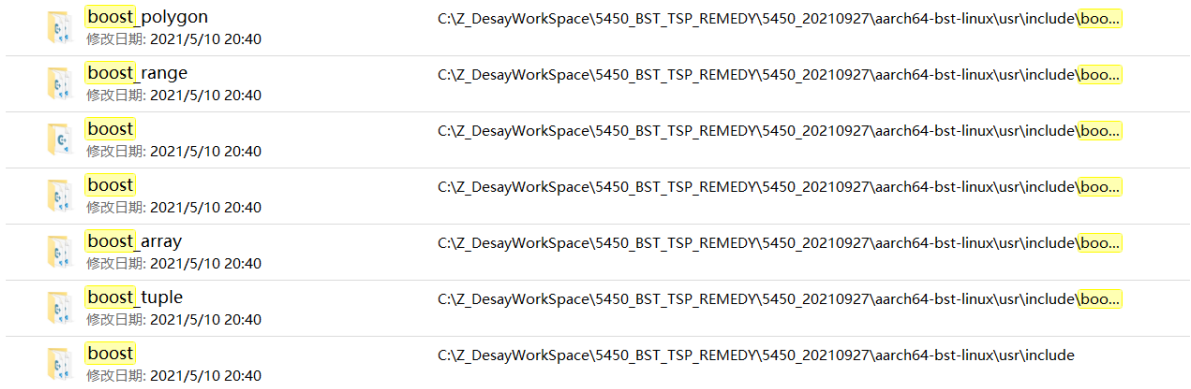
opencv:



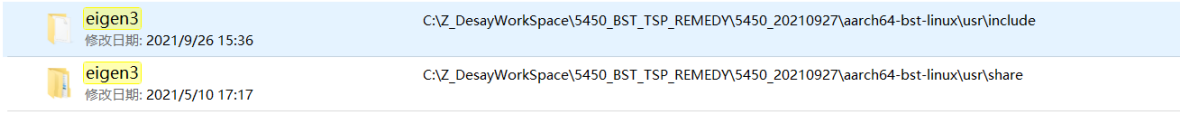
openssl:

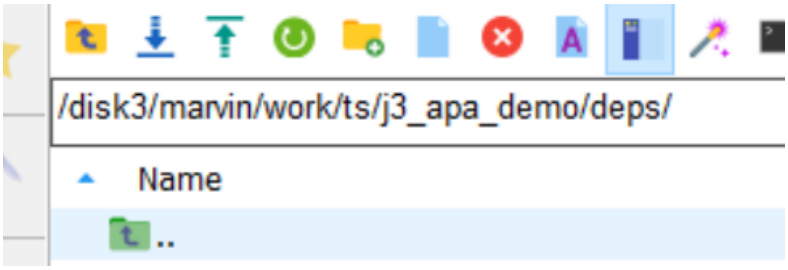


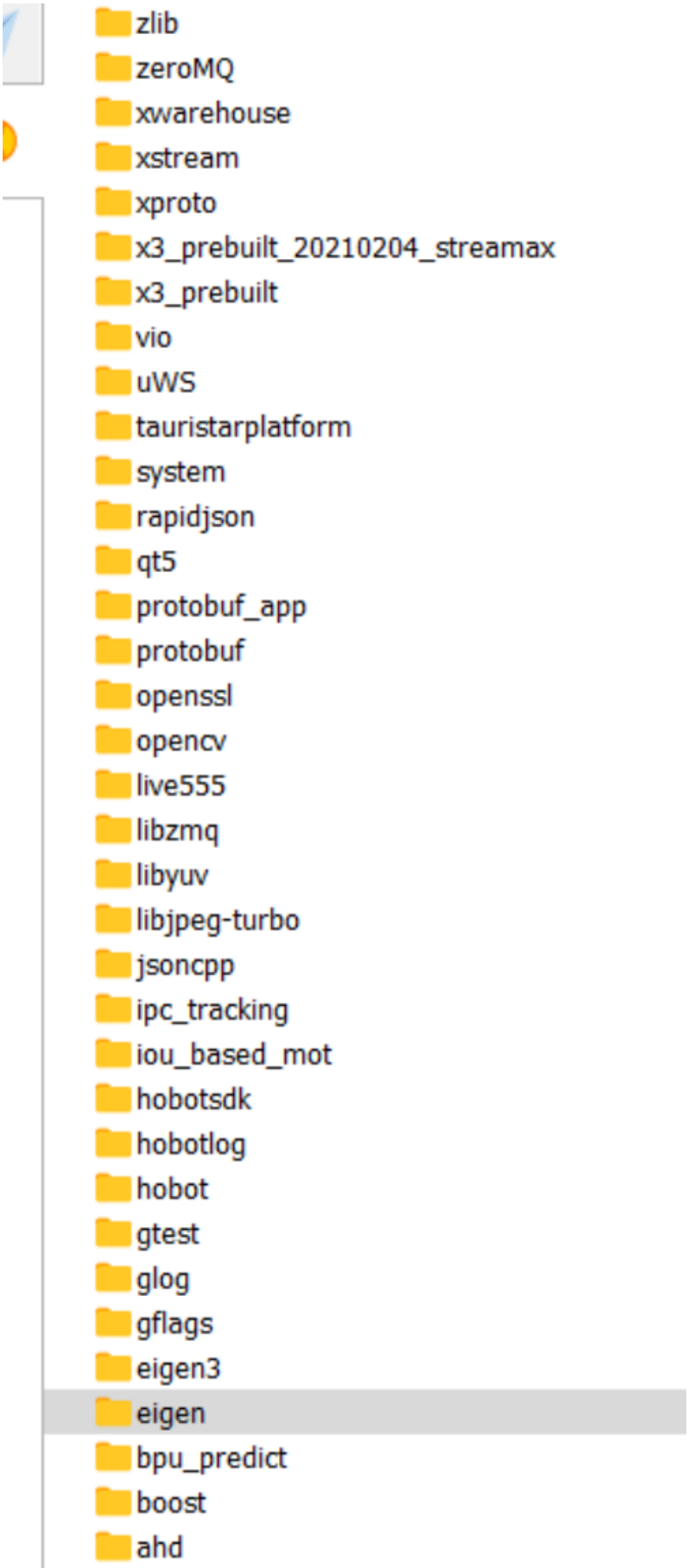
boost:



eigen:






zlib
zeroMQ
xwarehouse
xstream
xproto
x3_prebuilt_20210204_streamax
x3_prebuilt
vio
uWS
tauristarplatform
system
rapidjson
qt5
protobuf_app
protobuf
openssl
opencv
live555
libzmq
libyuv
libjpeg-turbo
jsoncpp
ipc_tracking
iou_based_mot
hobotsdk
hobotlog
hobot
gtest
glog
gflags
eigen3
eigen
bpu_predict
boost
ahd

需要准备的文件：

S.NO.	ITEM	
01	BST_DEPS	todo
02	bst_tools.cmake	todo
03	bst_cross_make.sh	todo